WHAT IS CLAIMED IS

1. A heterobipolar transistor, comprising:
a substrate;
a collector layer formed on said substrate;
a base layer formed on said collector layer; and
an emitter layer formed on said base layer,
said base layer comprising a SiGeC ternary mixed crystal having a C concentration profile such that a C concentration in said base layer increases from a first interface facing said emitter layer to a second interface facing said collector layer.

2. A heterobipolar transistor as claimed in claim 1, wherein said substrate is a Si substrate.

3. A heterobipolar transistor as claimed in claim 1, wherein said base layer has a Ge concentration substantially constant from said first interface to said second interface.

4. A heterobipolar transistor as claimed in claim 1, wherein said base layer has a Ge concentration that increases from said first interface

to said second interface.

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5. A heterobipolar transistor as claimed in claim 4, wherein said base layer has a C concentration and a Ge concentration that change from said first interface to said second interface while maintaining a constant ratio.

6. A heterobipolar transistor as claimed in claim 5, wherein said ratio is set so as to avoid defect formation in said base layer due to lattice misfit with respect to said substrate, from said first interface to said second interface.

7. A heterobipolar transistor as claimed in claim 5, wherein said ratio is set so as to achieve a lattice matching in said base layer with respect to said substrate, from said first interface to said second interface.

8. A heterobipolar transistor as claimed in claim 4, wherein said Ge concentration and said C concentration change from said first interface to said second interface continuously.

9. A heterobipolar transistor as claimed in claim 1, wherein at least one of a Ge concentration and said C concentration has a non-zero value at said first interface.

10. A heterobipolar transistor as claimed in claim 1, wherein at least one of a first region of said emitter layer adjacent to said base layer and a second region of said collector layer adjacent to said base layer contains C.

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11. A heterobipolar transistor as claimed in claim 10, wherein both of said first and second regions contain C.

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12. A heterobipolar transistor, comprising:

a substrate;

a collector layer formed on said substrate;

a base layer formed on said collector layer; and

an emitter layer formed on said base layer,

said base layer comprising a SiGe binary mixed crystal,

said emitter region including a first region contacting with said base layer, said collector layer including a second region contacting with said base layer,

at least one of said first and second

regions containing C.

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13. A heterobipolar transistor as claimed in claim 12, wherein both of said first and second regions contain C.

14. A method of forming a SiGeC mixed crystal layer, comprising the step of:

supplying SiH_4, GeH_4 and a gaseous source of C containing two or more C atoms in a molecule to a surface of a substrate respectively as sources of Si, Ge and C.

15. A method as claimed in claim 14 wherein said substrate is a Si substrate.

16. A method as claimed in claim 14, wherein one of $(CH_3)_2SiH_2$ and $(CH_3)_3SiH$ is used as said gaseous source of C.

17. A method as claimed in claim 14, wherein said step of supplying SiH_4, GeH_4 and said gaseous

source of C comprises the steps of: (a) supplying SiH_4 to said substrate surface; (b) supplying, after said step (a), said gaseous source of C to said substrate surface; and (c) supplying, after said step (b), GeH4 to said substrate surface.

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18. A method as claimed in claim 14, wherein said gaseous source of C is supplied with a variable rate with a growth of said SiGeC mixed crystal layer.